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## CHAPTER TWELVE

# MEMORY AND REALITY

Our memory is our contact with the world beyond the present. We make assessments about the nature of the reality, how it works, and what has happened in the past, based on what we remember. Most of the time our memories are fairly accurate and we get along fine. However, other times, what we remember and what actually happened may differ. For example, if you misremember that you turned off the oven before you left for vacation when in reality you left it on, you risk burning down your house, or at least a very large gas bill. It is important to understand when our memories can betray us and when they can be trusted. What are the circumstances that cause memory and reality to part ways?

In this chapter we discuss issues of how memory and reality square up and how our ideas of the past may be faulty. The first issue is how we keep track of where our memories come from, or source monitoring, which includes situations of unconscious plagiarism, or cryptomnesia, and false fame effects. We also examine the sleeper effect and how this affects our attitudes and opinions. We look at cases where people remember things that never happened, called false memories. This includes implanted memories and memories recovered under hypnosis. Finally, we look at how the normal use of memory can change it, as with verbal overshadowing and the revelation effect.

## SOURCE MONITORING

Many of the issues that we have seen so far have been on what a memory is about. Although this is important, another critical factor is knowing *where* a memory came from. For example, was a story heard on the news or from a friend? Was it all just a dream? The ability to keep track of where memories come from is **source monitoring** (Johnson, Hashstroudi, & Lindsay, 1993), and it involves processes over and above those used to assess whether something is old or new (Johnson, Kounios, & Reeder, 1994; Lindsay & Johnson, 1991). However, as complex as it is, source monitoring does not necessarily require complete conscious awareness of a source. Accurate judgments are regularly made using vague and partial information associated with less conscious feelings of familiarity (Hicks, Marsh, & Ritschel, 2002; Meissner, Brigham, & Kelley, 2002).

Source monitoring requires people to take source and content information and integrate them into a common memory trace. Later there is an active search of memory for source information. Each of these stages involves a different part of the brain. The integration of different types of information involves the hippocampus, whereas the search for source information, being a controlled memory process, involves the frontal lobes, and the actual retrieval of information emphasizes the temporal lobes (Senkfor & Van Petten, 1998), as well as the parietal lobes when there is conscious recollection (Leynes & Phillips, 2008).

## Types of Source Information

Different types of information are used to evaluate the source of a memory. One criterion is *perceptual detail*. This is perceptual information that is encoded into the memory, such as what a person was looking at or hearing when the memory was created. Memories of events that were actually experienced often have more perceptual detail than those generated by hearing about an event from someone else or imagining it. For example, people find it easier to discriminate between words they actually said versus words they only imagined saying. The difference in perceptual experiences in these two cases is relatively pronounced. However, people find it harder to remember words that another person actually said versus "hearing" in their mind the words being said in that person's voice (Johnson, Foley, & Leach, 1988). This is because they have similar perceptual or pseudoperceptual qualities.

Another criterion is *contextual information* about the context in which a memory was acquired. For example, if people remember seeing a plane crash while they were at an airport, it is more likely that the event was witnessed. However, if people remember seeing the plane crash while they were sitting in their living room, it is more likely they saw it on the local news. Thus, people use expectancies based on the context to help make source monitoring decisions (Bayen, Nakamura, Dupuis, & Yang, 2000).

People remember source information better when the source is consistent with expectations than if a memory is from an unexpected source, suggesting that some guessing is involved (Bayen, Nakamura, Dupuis, & Yang, 2000). These expectancies are more likely to be operating at retrieval than at encoding (Hicks & Cockman, 2003). For example, it is easier to recall that a reminder to call your mother came from your sister than from your professor because the first is more expected, even if the second were true. People can also be swayed by what others say. For example, if you know that other people claimed to have witnessed something, you are more likely to mistakenly claim to have seen something you only imagined (Hoffman, Granhag, See, & Loftus, 2001).

A third criterion is the amount of *semantic detail and/or affective information*. This is how much a person was mentally and emotionally involved in the events. This can include thoughts that a person had (e.g., "Man, Bob must really be stupid to ask if gravity's getting heavier") or emotional reactions (e.g., "I remember feeling really queasy when I saw what the car accident had done to that girl's face"). This information helps us figure out where a memory came from. It should be noted that source information is less likely to be bound to an emotional memory (Cook, Hicks, & Marsh, 2007), perhaps because emotional responses tend to focus our attention on the central object, and less on the context or source.

A final criterion is *cognitive operations*, the mental processes done are encoding, including retrieving information from memory, manipulating it, trying to generate a mental image, and so on. This is more likely to be found in memories of things that were only thought about. When we think things through, we not only remember what we were thinking about, but also the mental activity that we used to generate those thoughts. Source memory may sometimes show a generation effect (see Chapter 3) and be better for information that a person actually generated (because of the stored cognitive operations) compared to something that was simply read (Geghman & Multhaup, 2004).

## Types of Source Monitoring

There are three types of source monitoring (Johnson, Hashstroudi, & Lindsay, 1993): internal source monitoring, external source monitoring, and reality monitoring. Table 12.1 provides a summary of these.

**Internal source monitoring** involves distinguishing between actions a person either thought about or actually did. The person who is trying to remember if he or she locked the back door before going on vacation is engaged in internal source monitoring. Perceptual detail is important for these decisions because actions actually taken have more perceptual details in memory (e.g., remembering seeing the key turning in the lock), whereas events that were only thought about will have fewer perceptual details. A similar point can be made for context. Semantic detail and emotional reactions are likely to be low because these actions were generated by the person and so are unlikely to be reacted to. Finally, cognitive operations are likely to be high in both because the person is planning to carry out the action. The question is whether it was done.

A second type of source monitoring is **external source monitoring,** in which a person distinguishes between two external sources. Who told you this, Susie or Jane? Did you read about this in a newspaper or a supermarket tabloid? Perceptual detail is important because different external sources have different perceptual details (e.g., a man's voice or a woman's voice). Contextual information is also informative. For example, when deciding which of two people told you something, and you always see one person in your neighborhood and the other on campus, then knowing where you heard something can help you narrow it down. Semantic detail and emotional reactions can be used similarly. Finally, because the information is coming from outside the person, cognitive operations are likely to be low and uninformative about source.

**Reality monitoring** (Johnson & Raye, 1981) involves distinguishing among memories of events that actually happened and those that were only imagined. For example, did a witness to a car accident actually see broken glass, or did he or she only hear someone speak of

**TABLE 12.1 Types of Source Monitoring and How They Relate to Different Types of Source Information**

| TYPE | PERCEPTUAL DETAIL | CONTEXTUAL INFORMATION | SEMANTIC DETAIL | EMOTIONAL REACTIONS | COGNITIVE OPERATIONS |
|---|---|---|---|---|---|
| Internal | + | + | − | − | − |
| External | + | + | + | + | − |
| Reality | + | + | + | + | + |

broken glass later? It is more common for people to mistakenly think they saw things that were only read or heard about, and less common to think that something that was seen was only read or heard about (Belli, Lindsay, Gales, & McCarthy, 1994). Also reality monitoring errors are less likely for emotional information (Kensinger & Schacter, 2006).

Perceptual detail is important in reality monitoring. Real events have more perceptual details than imagined events. Moreover, real event memories have more contextual information than memories of imagined events. Semantic detail and emotional reactions are more developed in memories of real events. Last, knowledge about cognitive operations is scarcer for real events but plentiful for imagined events. Still, reality monitoring errors do occur, even when it would seem a person could easily discriminate between what was only thought about and what actually happened. For example, a week after viewing photographs and reading descriptions of scenes, people made frequent mistakes in identifying pictures of scenes they had only read about but made fewer mistakes when identifying scenes they had viewed photographs of (Intraub & Hoffman, 1992).

## Source Monitoring Errors

Source monitoring is pertinent for the topic of memory and reality because source information grounds memories in reality. Often, people are accurate about where their knowledge came from. However, errors can be made. For example, repeated attempts to remember, which can produce reminiscence and hypermnesia, can also increase the likelihood of confusing an imagined event for a real one (Henkel, 2004). This is because the repeated memory retrievals of imagined information may introduce more perception-like qualities to the memory (through the process of imagination) and make a memory seem more like something that actually happened. As a result, people claim that imagined events actually happened.

When source monitoring errors occur, a person's understanding of the world and what actually happened are at odds. For example, an internal source monitoring error can cause a person to believe he or she had done something that was not done. An external source monitoring error can cause a person to think that he or she had gotten information from one source when it was from another. Finally, a reality monitoring error can cause people to think that events had actually happened when they were only imagined.

Source misattributions can be biased to make ourselves look good. In a study of choice making (Mather, Shafir, & Johnson, 2000), people chose between two alternatives—for example, which of two people they would go on a blind date with. A number of characteristics of each person were given. Some were positive, such as "always interesting to talk to," and others were negative, such as "awkward in social situations such as parties." Some time after picking someone, people identified which characteristics belonged to which person. In general, people tended to misremember positive characteristics of the other choice as belonging to the person they picked and, to a lesser extent, tended to misremember the negative attributes of the person they picked as belonging to the person they rejected. This does not occur when options are assigned rather than chosen (Mather, Shafir, & Johnson, 2003). So our choices can distort our memories. We have a tendency to think of the things we choose as being more positive than they are and the things we do not choose as being more negative than they are.

## Source Cuing

Source information can also be used for retrieval and help a person remember. This is **source cuing** (Radvansky & Potter, 2000; see also Dodson & Shimamura, 2000; Jacoby, Shimzu, Daniels, & Rhodes, 2005). In contrast to engaging in source discrimination, which involves determining the source of a retrieved memory, in source cuing, knowledge of a source is used to narrow down or access traces in memory. For example, in music, the timbre on which a melody is played (e.g., piano, guitar, trumpet, etc.) may be source information because different timbres are associated with different instruments and so would be different entities in the world. If you hear a melody on one instrument, you are more accurate at identifying it later if it is played on the same instrument than if it is played on a different one (Radvansky, Fleming, & Simmons, 1995). The source information is a memory cue. The separation of source and content information is also seen in the surprising fact that people can correctly identify, at above chance levels, the source of an item, even if they can't remember the item itself (Cook, Marsh, & Hicks, 2006).

## Cryptomnesia

Knowing where information comes from can have important consequences. For example, it is important to know whether an idea is one's own or someone else's. When we present someone else's idea as our own, it is plagiarism, but not all plagiarism is intentional. Some plagiarism is unconscious and unintentional. This occurs when people come up with ideas they believe are their own but in fact were encountered in the past. This memory of the previous encounter has an unconscious, implicit effect, in the absence of knowledge of the information's original source. This unconscious plagiarism is **cryptomnesia** (but see Brown & Halliday, 1991, for a different account).

Why does cryptomnesia occur? One idea is that it is a reality monitoring error. A person retains the information in memory, but because of the amount of time that has passed and/or because little attention was paid during the original encoding, the memory is weak, and the source information has little or no influence later. The feeling of familiarity produced only boosts a person's confidence in the idea. Also, memories of plagiarized ideas have many of the same phenomenological characteristics as accurate memories (Brédart, Lampinen, & Defeldre, 2003), such as confidence in these memories.

Another way that source monitoring errors produce cryptomnesia is by having people take existing ideas and elaborate or improve on them (Stark & Perfect, 2006; 2007). For example, people might try to think of novel uses for an object, like a brick. Then during an elaboration phase, people try to improve on the ideas, both their own and other people's. By elaborating on the information, there are now memories for cognitive operations associated with that idea, and so it seems more like something a person would have thought of, rather than something that was heard from someone else. This cryptomnesia gets worse the more times people elaborate on the ideas (Stark & Perfect, 2008). This is why people working in groups where everyone is generating ideas and trying to improve on each other's ideas may later misremember which ideas were generated by other people, and thus experience cryptomnesia.

## False Fame

A powerful way to manipulate memory is to influence the frequency that something is encountered. For example, information that is repeatedly encountered is more likely to be remembered, may become overlearned, and subsequently be chronically available (see Chapter 7). However, different components of a memory are forgotten at different rates. Information content may be remembered for a long time, but source knowledge may be lost. Alternatively, source knowledge may never have been learned or learned very poorly. In either case, a person may need to reconstruct the missing information perhaps by using how familiar the memory seems. Familiarity is related to how frequently something has been encountered.

One source monitoring error that is familiarity based is the **false fame effect** (Jacoby, Kelley, Brown, & Jasechko, 1989). This is the tendency to think that someone is famous or more famous than he or she really is because his or her name is familiar. For example, you may think that your favorite musicians or actors are more widely known because they are well known to you. The false fame effect is even more dramatic in that it may be possible to take a person who has utterly no fame whatsoever and make him "famous" overnight. This is done using the principle of mere exposure (see Chapter 6).

In a study, a memory researcher might give people a list of names. Some names are of people who were mildly famous for a time, such as Roger Bannister, Minnie Pearl, and Christopher Wren. These are names that most students might recognize but not quite remember who they were. The other names on the list are people who are not famous, such as Sebastian Wiesdorf, Larry Jacoby, and Gabriel Radvansky. The task is to go through the list and pick out who is famous and who is not. Later, people are given a new list of names of famous people, nonfamous people whose names were seen before, and new nonfamous names. Half of the people are given this new list immediately after the first, but the other half are given this the next day. People who got the second list the next day are twice as likely to call nonfamous people famous simply because they had seen those names earlier. Thus, those names became famous overnight!

This false fame effect can occur if a person is distracted by another task (such as listening to a series of numbers, waiting for three odd numbers in a row) while they are first learning the names (Jacoby, Woloshyn, & Kelley, 1989). In such cases, because the name was familiar, the person said that it was somebody famous. Thus, the link between memory content and source is disconnected (Steffens, Buchner, Martensen, & Erdfelder, 2000). There is an unconscious influence of previous memories (this name was encountered before) on conscious efforts to make a decision (is this name famous?). This is one reason why some people say that there is no such thing as bad publicity. People may remember that they've encountered a name before but not why. The more times a name is seen or heard, the more familiar it is, and the more famous that person seems. (It's not a good idea to overdo it. Eventually people connect unflattering information with a name, as with the name Hitler.)

Another consequence of increased frequency is that people prefer things that are familiar. This has some survival value. We are not tempted to try new things, which could be dangerous. If we stick to familiar things, we are more likely to survive because we've survived encounters with them before. This is why publicists for actors, musicians, or politicians try to get their client's name heard as often as possible. The more the name is heard, the more familiar it is, the more famous the person is, and the more people like them. This is also why advertisers try to get their commercials played as often as possible. The more familiar the product's name, the more people like it, and the more they are going to buy it.

## Social Influences and the Sleeper Effect

Source memory can also be affected by social factor, such as the influence of social stereotypes. When asked to remember from whom a set of statements came from, people who forget the appropriate source misattribute statements to people based on social stereotypes (e.g., Bayen, Nakamura, DuPuis, & Yang, 2000; Dodson, Darragh, & Williams, 2008). For example, people are more likely to attribute the statement "I'll come talk to you as soon as I wash up." to a doctor and the statement "I had a deposition yesterday." to a lawyer, even if the opposite were true.

A phenomenon in social psychology that involves source monitoring is the **sleeper effect** (see Kumkale & Albarracin, 2003, for a review). This occurs when people get propaganda from a source of either high or low credibility. If the source has low credibility, then people initially discount it. However, after a few days, weeks, or months, people still remember the information but now consider it more credible than before. What previously seemed unreasonable has, with the simple passage of time, become reasonable (Hovland & Weiss, 1951; Weiss, 1953). The sleeper effect is shown in Figure 12.1.

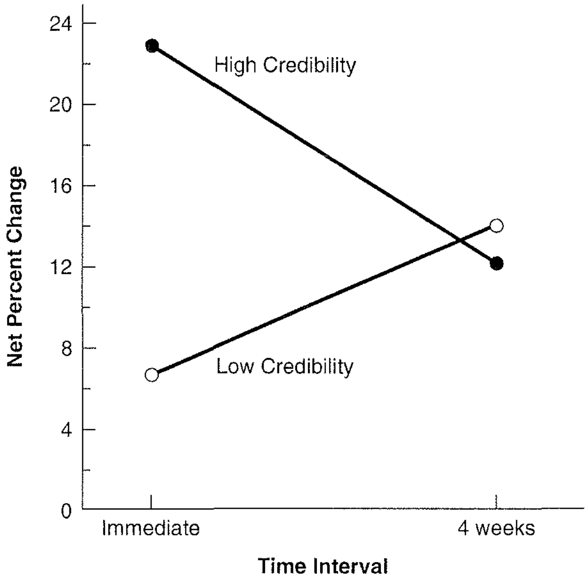

**FIGURE 12.1 An Illustration of the Sleeper Effect**

*Source:* Hovland, C. I., & Weiss, W. (1951). The influence of source credibility on communication effectiveness. *Public Opinion Quarterly, 15,* 635–650.

The sleeper effect occurs because people remember the content of a message but forget the source, or at least, the source is disconnected from the memory content. Thus, people accept ideas as credible because they no longer have the source information that would make it suspect (Underwood & Pezdek, 1998). Several components must be in place to get a sleeper effect. First, people must pay attention to the message to set up a memory trace of the content. Second, the message source should be discounted after the message was given, preventing people from discounting the message from the outset and not learning it. Finally, the person should rate the trustworthiness of the source immediately afterward. This provides more time for the source information to be forgotten (Pretkanis, Greenwald, Leippe, & Baumgarder, 1988).

A related finding is the **wishful thinking bias,** which is a tendency to misremember desirable information as having come from reliable sources, and undesirable information as having come from unreliable sources (Gordon, Franklin, & Beck, 2005), especially for information about yourself (Barber, Gordon, & Franklin, 2009). For example, if you hear someone say about you "Boy, she is really smart" you are more likely to misremember this as having been said by a reliable source, such as your professor, as compared to a less reliable source, such as your bus driver. This is more likely here because it is a positive statement about you, and not someone else. The opposite is true for negative statements.

### Synopsis

In addition to remembering information content, it is also helpful to remember where information came from. This is source monitoring, and it can include discriminating between external sources, whether one thought something or actually did it, or some event actually happened or was just thought about. Information about source can also be used as a memory cue. Although people are reasonably accurate at source monitoring, errors can occur and manifest themselves in unconscious plagiarism (cryptomnesia), false fame, and sleeper effects. In all of these cases, people remember content information but forget where it came from. As a result, they handle it differently than if they accurately remembered the source.

## FALSE MEMORIES

One intensively studied aspect of memory is the question of when and how people "remember" things that never happened. These are **false memories.** Their occurrence is especially important when our memories are the only source of information, as with eyewitness testimony.

### Deese–Roediger–McDermott (DRM) Paradigm

A simple way to create false memories is to use the **DRM paradigm**. First, people hear a list of words, such as those in Table 12.2. Soon after, they try to recall as many of those words as possible. Of course, people are able to recall only part of the list. The interesting thing here is that people often systematically misremember words that

**TABLE 12.2 Words That May Lead to a False Memory for the Word "Sleep"**

| | | | |
|---|---|---|---|
| bed | dream | doze | peace |
| rest | wake | slumber | yawn |
| awake | snooze | snore | drowsy |
| tired | blanket | nap | |

*Source:* Roediger & McDermott, 1995.

were not on the list. For example, for the list in Table 12.2, people often mistakenly say that they heard the word "sleep" even though it was not there (Deese, 1959; Read, 1996; Roediger & McDermott, 1995). Interestingly, over time people tend to forget false memories *less* than the true memories, even over periods as long as 2 months (Seamon et al., 2002).

False memories occur more frequently when there is a plausible context. People are likely to misremember the word "sleep" because all the other words in the list refer to things having to do with sleep. In fact, these words were selected because of their strong association with that word. The process of activating information and creating false memories occurs in as little as 4 seconds (Atkins & Reuter-Lorenz, 2008) suggesting that we create false memories as we actively comprehend the world around us.

In general, false memories are guided by how many associations there are between the words that were actually seen (the more the better), as well as the general recallability of the actual words (the fewer the better) (Roediger, Watson, McDermott, & Gallo, 2001). The larger number of associations makes it more likely that a false memory word will be primed or unconsciously activated. The less recallable the actual items are, the more likely a person will do some guessing or memory reconstruction, making it more likely that a false item will be "remembered." These false memories are based on partial information (Heit, Brockdorff, & Lamberts, 2004). For example, a person may misremember the source (it was thought about but not heard) or use more gist than verbatim memories (Brainerd, Payne, Wright, & Reyna, 2003; Brainerd, Wright, Reyna, & Mojardin, 2001). Because memories for pictures are much more detailed and less gist oriented, they are less likely to show this effect (e.g., Hege & Dodson, 2004).

The DRM false memory effect is supported by ERP measures. At encoding, in conditions that lead to false memories, there is greater neural positivity in the ERP signal compared to when people remember accurately (Urbach, Windmann, Payne, & Kutas, 2005). This can be seen in Figure 12.2. This suggests that when a false memory occurs, during encoding, people are not paying as much attention to the details of the real information, as revealed by the weaker ERP signals. fMRI recordings have found that false memories are associated with more activity in those the brain used for creating mental images (see the description of imagery inflation later in this chapter), particularly the anterior cingulate cortex (B.A. 24), precuneus medial parietal lobes (B.A. 7), and right inferior parietal lobe (B.A. 40) (Gonsalves et al., 2004).

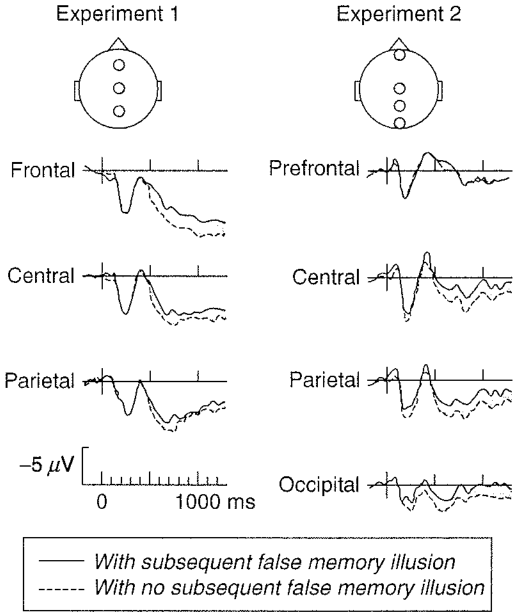

**FIGURE 12.2 ERPs for Correctly Recognized Studied Words That Either Did or Did Not Result in a Later False Memory**

*Source:* Urbach, T. P., Windmann, S. S., Payne, D. G., & Kutas, M. (1971). Mismaking memories: Neural precursors of memory illusions in electrical brain activity. *Psychological Science, 16,* 19–24.

The P300 component of an ERP signal reliably occurs *about* 300 ms after people are given a memory probe, and is associated with recognition. With false memories, the P300 is observed earlier than with true recognition (Miller, Baratta, Wynveen, & Rosenfeld, 2001). Also, there is less gamma activity during the recall of false memories, particularly in the hippocampus and left temporal lobe (Sederberg et al., 2007). This suggests that people are making these memory decisions faster perhaps because they are being less thorough and using less information.

This creation of a false memory can be influenced by a number of factors. One is the operation of inhibition, which was described in Chapter 7. Two memory processes that are thought to use inhibition are directed forgetting and part-list cuing (Kimball & Bjork, 2002; Kimball Bjork, Bjork, & Smith, 2008). When people are asked to forget a set of words that regularly elicits a false memory, the rate of producing false memories goes up. Apparently, the instruction to forget inhibits the memory for that list, thereby making access to the memories for the entire list harder. As a result, people have trouble discriminating between what was actually heard and what was not, so more false memories are produced.

In contrast, if people are given part of the original set of items, the part-set cuing effect is extended to the critical unpresented word, as well as those that were actually heard. Because all the other information is suppressed by the cued-for information, the

**TABLE 12.3 Sentences Used in the Bransford and Franks (1971) Study**

| | |
|---|---|
| The ants ate the sweet jelly, which was on the table. | The ants ate what? |
| The ants in the kitchen ate the jelly, which was on the table. | The ants were where? |
| The ants in the kitchen ate the jelly. | What was in the kitchen? |
| The ants ate the sweet jelly. | The jelly was what? |
| The ants were in the kitchen | What was in the kitchen? |
| The jelly was on the table. | What was on the table? |

false memories rate declines. In other words, not only are the words that were actually heard suppressed, but so are the ones that would have been false memories.

## False Memories from Integration

Another way people misremember is when items that were presented at different times are integrated into a single memory trace. Thus, with integration, what were actually several events are misremembered as one. This is similar to the schema integration processes discussed in Chapter 9. So, people may misremember different pieces of information as being part of the same event if they "seem" like they should go together.

An example of integration is a study by Bransford and Franks (1971) in which people read a list of sentences, as shown in Table 12.3. During study, people had to answer simple questions, also shown in the table. (Go ahead and read the sentences and answer the questions now.) Afterward, people identified which sentences they had seen before. In addition, they rated their confidence in their answers. An example recognition test is shown in Table 12.4. Try to identify which sentences you remember seeing. Also, rate how confident you are. After you are done, look at Table 12.3 to see which sentences were actually there.

The important result was that memory did not simply reflect whether a sentence was seen before. The study and test sentences varied in the number of simple idea units (called propositions) they had, which could be 1, 2, 3, or all 4 propositions from a given theme. For example, in one theme the sentence "The ants were in the kitchen" is a one-proposition sentence, "The ants in the kitchen ate the jelly" is two, "The ants in the kitchen ate the jelly, which was on the table" is three, and "The ants in the kitchen ate the sweet jelly, which was on the table" has all four propositions. On the memory test, the more propositions a test sentence had, the more likely people "remembered" it. A sentence with four propositions that was not read was more likely to be "recognized" than a sentence with only one proposition that was actually read. Moreover, confidence ratings showed the same pattern and increased with the number of propositions, as shown in Figure 12.3.

When people read the sentences, because there is overlap in content, they are interpreted as referring to a common situation (see also Chapter 7). This makes integration easy. This integrated representation is then used to make memory judgments. Items that contain more propositions more closely match the memory trace, and so are more likely

**TABLE 12.4 Recognition Test from the Bransford and Franks (1971) Study**

The ants in the kitchen ate the sweet jelly, which was on the table.
The ants in the kitchen ate the sweet jelly.
The ants ate the sweet jelly.
The sweet jelly was on the table.
The ants ate the jelly, which was on the table.
The jelly was sweet.
The ants ate the jelly.

to be recognized and given higher confidence ratings. People use memories of entire events that they created, not memories for what they actually experienced.

This integration process is also seen with normal reading. When people read fictional stories about real people, they may misremember fiction as fact. The fictional knowledge is integrated with the real knowledge. Although people are aware that the story had some fictional information, they also think that they knew some of the fictional information *before* reading the story (Marsh, Meade, & Roediger, 2003). What's more, if people are warned about this memory distortion, even before they read, they still incorporate inaccurate information into semantic memory (Marsh & Fazio, 2006).

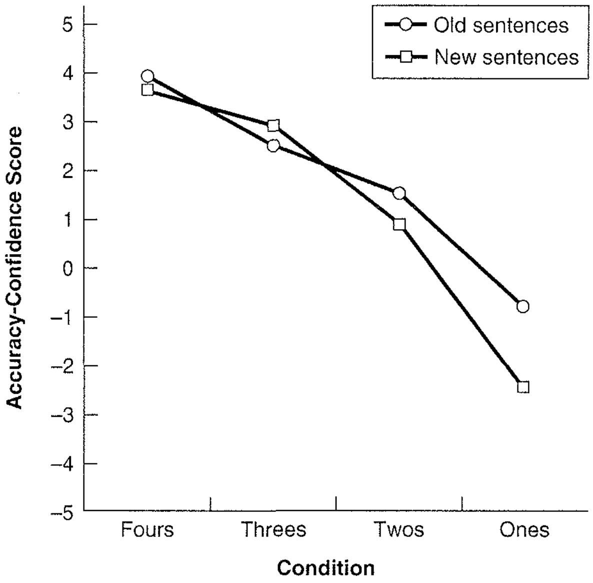

**FIGURE 12.3 Recognition Test Data from the Bransford and Franks (1971) Study**
**The accuracy score reflects the combined influences of people's selection on items along with their confidence in having heard items before.**

*Source:* Bransford, J. D., & Franks, J. J. (1971). The abstraction of linguistic ideas. *Cognitive Psychology, 2,* 331–350.

## Implanted Memories

In the preceding examples, false memories were created almost as a natural consequence of thinking about information. The false information is never explicitly conveyed. However, it is possible to explicitly implant false memories (Loftus, 2004). One way this occurs is if people overtly question whether someone remembers something. For example, if someone tells you that your mother says that when you were 8-years old, you got lost in a mall, and then repeatedly asks if you remember that incident. Another way to implant memories is if a person overhears or reads another person's report. For example, if you hear me say that I remember a story about whales on the news, you might later misremember reading the story yourself (Meade & Roediger, 2002). Finally, people who are told that, as a child, they had an unpleasant experience with a food they don't eat often (e.g., egg salad), they will avoid that food in the future, as if they had a real taste aversion experience (Bernstein & Loftus, 2009; Geraerts et al., 2008). These implanted memories are delivered in such a way that people believe that they are real. This sounds strange, but it's true.

Implanted false memories are observed for autobiographical memories, not just word lists. Again, the likelihood of creating a false memory is a function of how plausible it is (Pezdek, Finger, & Hodge, 1997). In one study, students were asked about events to see if their memories corresponded with those of their parents. The researchers relayed a description of an event that was presumably described by the student's mother but that had never happened. This event was one that was consistent with being raised either Jewish or Catholic. Jewish students were more likely to have a false memory for the Jewish event than the Catholic event, and vice versa, as shown in Table 12.5. Thus, the probability of having a false memory is a function of the event plausibility. However, it is possible for people to have false memories of implausible events, such as witnessing a demonic possession, if the event is made to seem more plausible, such as reading articles about possession. Increased plausibility makes it more likely that people will claim that the event actually occurred to them (Mazzoni, Loftus, & Kirsch, 2001; Pezdek et al., 2006).

In some unfortunate cases, people inadvertently get implanted memories from overzealous and substandard therapists looking for repressed memories (Loftus, 1993). The suggestion that these "memories" were repressed makes it more likely that a person will accept them as real. The normal scrutinization of the memory content and source does not take place.

A technique that makes the creation of implanted false memories more likely is visualization or imagination, which also increases the confidence that people feel about them. This is **imagination inflation** (Garry & Polaschek, 2000; Mazzoni & Memon, 2003). Imagination makes memory traces richer in detail and gives them pseudoperceptual

**TABLE 12.5 Number of People Reporting False Memories for Catholic and Jewish Events**

| PARTICIPANTS | NEITHER EVENT | CATHOLIC EVENT ONLY | JEWISH EVENT ONLY | BOTH EVENTS |
|---|---|---|---|---|
| Catholic | 19 | 7 | 1 | 2 |
| Jewish | 19 | 0 | 3 | 0 |

*Source:* Pezdek, Finger, & Hodge, 1997.

qualities, making them more like real memories. Moreover, imagination inflation is greater if people already have some experience of the event, and it is plausible (Pezdek, Blandon-Gitlin, & Gabbay, 2006). For example, if people heard about something but did not see it, if they also imagined that they saw it, they are more likely to come to believe that it was seen (Henkel, Franklin, & Johnson, 2000). Imagination inflation has a greater influence when people take a first-person perspective (Libby, 2003) or with repeated imaginings (Thomas & Loftus, 2002). In general, false memories can be as much as twice as more likely when the details are relevant to yourself (Desjardnis & Scoboria, 2007). Over time, people claim to consciously "remember" actually doing imagined events, even if they are bizarre activities, such as sitting on dice (Thomas, Bulevich, & Loftus, 2003; Thomas & Loftus, 2002).

Given the power of imagination inflation, it is not surprising that actually viewing pictures makes false memories even more likely (Garry & Gerrie, 2005; although narratives have a bigger effect, Garry & Wade, 2005). If people see photos of themselves at the age that an event was supposed to have occurred, they create false memories at a higher rate (Lindsay et al., 2004). Viewing old family photos gives memory concrete perceptual information to put into the false memories, along with any additional memories that are triggered by seeing the pictures. Similarly, if people see pictures of places under divided attention, they may later misremember having been to those locations (Brown & Marsh, 2008).

Although it seems unlikely, it is possible for people to implant false memories in themselves. In a study by Zaragoza et al. (2001; see also Chrobak & Zaragoza, 2008), students at Kent State University first watched a film. Afterward, they were asked a number of questions about the movie. Some people were told to answer all of the questions, even if the described event did not occur in the movie. For example, a question might be "The chair broke and Delaney fell on the floor. Where was Delaney bleeding?" when the character did not bleed. That is, the students manufactured an answer that they knew to be false. What is interesting is that during memory tests a week later, students who knowingly confabulated answers during the first part of the study now accepted many (32 percent) of these answers as truth. Moreover, if the experimenter had provided supportive feedback during the made-up response (such as "Yes, that's right"), then the rate of accepting these self-implanted false memories was higher (38 percent) than if only neutral feedback (such as "Okay") had been given (26 percent). Thus, even minimal external support of self-implanted false memories boosts their credibility (see also Thomas, Bulevich, & Loftus, 2003).

Although people can falsely remember implanted information, there are some qualities that distinguish true from false memories. True memories are often richer in detail, are more emotional, and are more likely to be "recollected" and to be field memories. In contrast, false memories are more likely to be stereotypical events, to be "known," and to be observer memories (Frost, 2000; Heaps & Nash, 2001). However, these are not defining criteria because true and false memories overlap on all of these qualities. These are only trends that characterize the set of false memories as a whole from the set of true memories. This is like saying men are taller than women. While this is true in general, there is a great deal of overlap between these two distributions. Just as you cannot make any clear judgments about the sex of a person given their height, you cannot use such qualities of a memory to determine if it is true or false.

## False Memories: A Social Contagion

As with source monitoring, false memories are influenced by social factors. As a reminder, people are more willing to say that they "remember" events that were only imagined if other people also claim they saw them (Roediger, Meade, & Bergman, 2001; Reysen, 2007). This is memory as a "social contagion." Just hearing other people relate events may cause us to remember them as if we experienced them.

That said, working with other people does not always lead to more false memories. For example, with the DRM paradigm, people working in actual groups recall more actually presented words than people working in nominal groups or alone; however, the rate of recalling false memories does not change (Maki, Weigold, & Arellano, 2008).

The social influence of implanted false memories is also affected by the people involved. False memories are more likely to occur in people who are prone to dissociative experiences (e.g., driving and not remembering what happened the past few miles). These people may have a harder time distinguishing between what was real and what was plausible but imagined. Furthermore, false memories are more likely when the person who provides the implanted information is extroverted. This influence is particularly strong when the person who is remembering is more introverted (Porter, Birt, Yuille, & Lehman, 2000).

## Emotional Consequences

The influence of emotion on false memories is complicated. In the DRM paradigm, compared to emotionally neutral items, false memories are more likely if a set of words is emotionally negative, but less likely if it is emotionally positive (Brainerd et al., 2008). Negative emotional content encourages more gist-based processing, causing people to be more willing to remember something that is generally consistent with the actual information, producing a false memory. However, positive information encourages more item-specific, verbatim memories, which decreases the likelihood of false memories.

In comparison to emotional content, the emotional mood of the person also influences the creation of false memories. In the DRM paradigm, relative to people who are in a neutral mood, false memories are more likely in people who are in a positive mood and less likely in people who are in a negative mood (Storbeck & Clore, 2005), although this may due to emotional intensity rather than negativity (Corson & Verrier, 2007; Kensinger & Schacter, 2006). Positive moods encourage relational processing, which would encourage the activation of a common associate concept, whereas negative moods encourage item-specific processing, which discourages the activation of what would become the false memory.

## Hypnosis and Memory

If you are not familiar with **hypnosis,** you should be aware that this is a real thing. It is an altered state of consciousness in which a person is more willing to accept and follow the suggestions of the hypnotist. People vary in the degree to which they can be hypnotized. Some people are not at all susceptible, whereas others are highly susceptible to the point of being able to experience auditory, visual, or tactile illusions.

While there are many interesting topics that can be explored with hypnosis, the issue at hand is how hypnosis influences memory. Does hypnosis make memory better, worse, or have no appreciable effect? At first blush, it seems that hypnosis has a beneficial effect on memory. If you put people under hypnosis and ask them to recall things, they report more than if they are not under hypnosis.

However, there are problems. For one thing, there is a larger risk that the memories people report are inaccurate (Scoboria, Mazzoni, Kirsch, & Milling, 2002; Smith, 1983). The new accurate information that is reported under hypnosis is no different from the hypermnesia that one would normally see with repeated recall (see Chapter 3). Anything beyond that are often false memories. In a study by Dinges et al. (1992), people were given 40 line drawings to look at and memorize. People were then asked repeatedly to report what they had seen either when they were hypnotized, or not. A forced recall test (see Chapter 3) was used, in which the people had to recall 40 things. Thus, hypnotized and unhypnotized people were equated for the amount of information reported. What was found was that there was no difference in how much was recalled when people were hypnotized or not. Consistent hypermnesia was observed in all cases. Thus, hypnosis adds little to the ability to remember more than what is normally seen.

### Synopsis

The separation between memory and reality is most salient when people have false memories of events that never occurred. These false memories come from different sources and take several forms. For example, people can mistakenly think a word that is closely related to other words on a list was actually heard earlier. Other times, false memories come from our natural impulse to integrate several pieces of information into a single, coherent memory, and we misremember what individual pieces were learned apart from the whole. More disturbing are situations where false memories are created by a failure to resist the implanting of false information from outside sources. These implanted false memories are even more likely when the information comes from a trusted source, including when that trusted source is a hypnotist. However, it should be noted that while we are easily misled in some circumstances, our grip on reality is fairly firm, and do not create false memories wildly but create them for things that are likely to have occurred anyway. Thus, with most false memories, little if any harm is done.

## FALSE MEMORIES THROUGH NORMAL MEMORY USE

Every time we use our memories we change them in some way. Different things that we do with the information alter memories' content. In this section we look at two examples of normal ways of using memory that can lead to false memories. These are verbal overshadowing and the revelation effect.

### Verbal Overshadowing

When we talk about things we've seen, our memories are changed by this verbalization. This is **verbal overshadowing.** When we describe an event, we create a verbal memory of our description. Because verbal information differs from visual information, our memory for what we said alters our memory for what we saw. This is consistent with fuzzy trace views that suggest that memory is a mixture of various traces. Overall, somehow our more recent verbal memories overshadow our older visual memories.

As an example of this, students at the University of Washington, in a study by Schooler and Engstler-Schooler (1990), watched a videotape of a bank robbery. Afterward, some people spent 5 minutes verbally describing the robber's face. Everyone was then shown eight pictures of similar faces and asked to pick out which one was the robber. It was found that students who produced a verbal description correctly picked the robber's face out 38 percent of the time, whereas students who did not provide a description picked out the robber 64 percent of the time. Thus, memory was worsened by talking about the experience. Verbal overshadowing is so powerful that even naming pictures of simple objects (e.g., saying "chair" to a picture of a chair) can make memory worse (Lupyan, 2008). It should be noted that verbal overshadowing does not occur if people only read a description—only when they actually generated a description does it occur (Dodson, Johnson, & Schooler, 1997).

Verbal overshadowing occurs even when the target face is not described. In a study by Dodson, Johnson, and Schooler (1997), verbal overshadowing was present when people described another face. Moreover, in a study by Westerman and Larsen (1997), when people described a car that was in a videotaped scene, memory for the target face still became more difficult. Thus, verbal overshadowing influences memory for the entire event, not just what was described. In these cases, there was a shift from visual to verbal information. Alternatively, verbalizing may alter the recognition process and make people more conservative, because verbal overshadowing is less likely to occur when people are forced to make a choice between several alternatives (Clare & Lewandowsky, 2004). Either way, talking about things can sometimes make memory worse. Finally, it should be noted that verbalization can act as a form of repeated practice in that details that are not talked about are more likely to be forgotten, even for emotionally intense events, such as hearing of the September 11th, 2001 terrorist attacks (Coman, Manier, & Hirst, 2009).

While verbal overshadowing occurs, providing a verbal description does not always make memory worse. In some cases, *verbal facilitation* occurs (e.g., Brown & Llyod-Jones, 2005, 2006; Lyle & Johnson, 2004). For example, if people are presented with a series of faces, and provide a description of each one as it is seen (in a control condition, no description is provided), people adopt strategies of encoding faces to memory. They can then take advantage of these verbal descriptions.

## Revelation Effect

When we interact with the world, sometimes information is revealed slowly over time. At such times we may be trying to figure out what we are dealing with. As a consequence of this revelation process, people are more likely to recognize information as old, for both old and new information. This is the **revelation effect** (Luo, 1993; Peynircioğlu & Tekcan, 1993; Watkins & Peynircioğlu, 1990). It can also occur when people make frequency judgments (how often something occurred) in addition to recognition judgments (Bornstein & Neely, 2001). There are several ways that the revelation effect is studied. For example, a word might be revealed one letter at a time until the person can make a recognition judgment (e.g., M _ _ _ _ _, M _ _ O _ _, M _ _ O _ Y, etc.). The revelation effect occurs only when people think they are remembering a prior event. It does not occur if people either know that no such episode occurred or if they engage in semantic memory retrieval (Frigo, Reas, & LeCompte, 1999; Watkins & Peynircioğlu, 1990).

The revelation effect appears because people are using memory familiarity (Cameron & Hockley, 2000; LeCompte, 1995; Westerman & Greene, 1996; but see Hicks & Marsh, 1998, and Niewiadomski & Hockley, 2001, for a response criteria account). As people go through the revelation process, the information feels more familiar, so they are more willing to claim it was seen before. This occurs even when people have not heard something before but were subjected to subliminal suggestions that they had (Frigo, Reas, & LeCompte, 1999). ERP recordings show that there is greater frontal lobe activity for information that was revealed (see Figure 12.4), consistent with the idea that people are relying on memory familiarity (Azimian-Faridani & Wilding, 2004).

Also consistent with this familiarity idea, the revelation effect is more likely when people are less able to consciously recollect the circumstances in which information was learned and need to rely on feelings of familiarity. So, having a longer delay between the original presentation and the memory test or presenting the information faster makes it

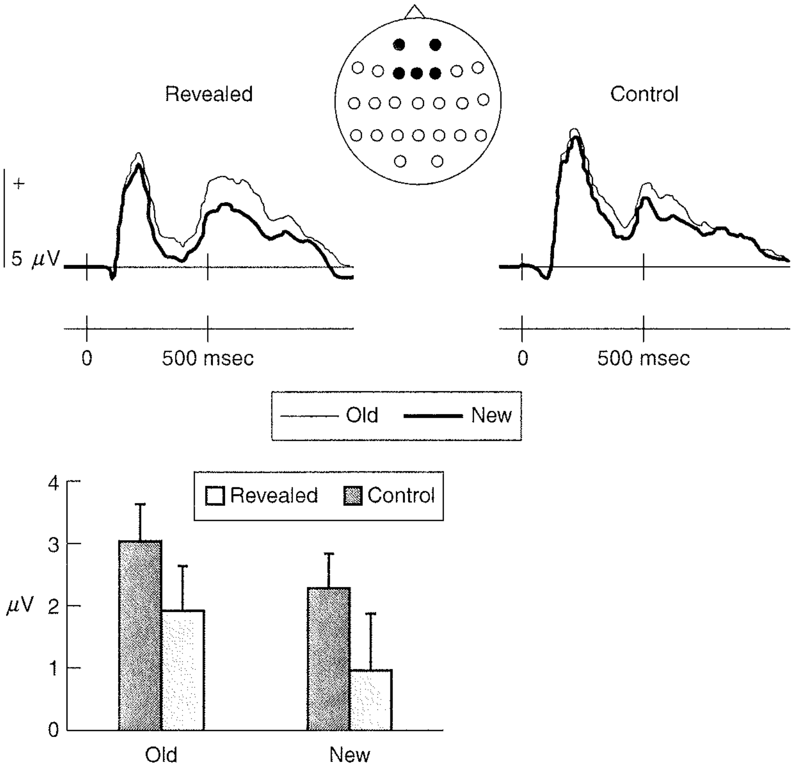

**FIGURE 12.4 ERP Data Showing That There is Less Cortical Activity Revealed Items Relative to Control Items That are Not Slowly Revealed**

*Source:* Azimian-Faridani, N., & Wilding, E. L. (2004). An event-related potential study of the revelation effect. *Psychonomic Bulletin & Review, 11,* 926–931.

harder for people to encode it in a way to make conscious recollection possible (Landau, 2001). This feeling of familiarity may even come in the form of general activation by a presumably unrelated prior task, rather than revelation itself, such as doing a working memory span task prior to recognition (Westerman & Greene, 1998), or by solving a problem such as an anagram (Dougal & Schooler, 2007). However, when retrieval emphasizes conscious recollection, the revelation effect may not be observed (Westerman, 2000).

The revelation effect not only applies to simple items, like words, but also to complex events (Bernstein, Godfrey, Davidson, & Loftus, 2004; Bernstein, Rudd, Erdfelder, Godfrey, & Loftus, 2009; Bernstein, Whittlesea, & Loftus, 2002). If people go through a process of trying to uncover their memories, this very uncovering process can increase the likelihood that a person will falsely claim that a memory is real. Thus, efforts at recovering previously hidden memories can lead a person to believe in false memories.

The revelation effect is similar to other phenomena, including the mere exposure effect (Chapter 6), and the false fame effect, in that memory is altered by prior encounters. More false memory reports occur if people are exposed to a brief preview of something, such as a word, face, or scene. This preview makes something seem more familiar, and people are more likely to report that they had encountered it earlier (other than the preview) (Brown & Marsh, 2009; Jacoby & Whitehouse, 1989; Titchener, 1928). This may partially explain a déjà vu experience. Sometimes people get an initial glace of something, and then later when they look at it more carefully, it seems oddly familiar.

### Synopsis

False memories can be created through what would seem to be the normal use of memory. For example, the seemly benign act of describing a witnessed event can lead to memory distortions. This occurs even when the part of the event being described is not the one that is tested later. Also, the gradual recovery of information during the memory search can create false memories. In this case, the build-up of partial memories during the revelation process leads to greater feelings of familiarity and the mistaken impression that the information was encountered before.

## SUMMARY

In this chapter we saw a number of ways that memory can depart from reality. An important aspect that is needed to help determine whether a memory is real is knowing its source. Source monitoring draws from different types of information to assess where a memory came from. While source monitoring is usually accurate, from time to time there can be errors in which a person either loses the source information or misattributes something to a wrong source. One example of a source monitoring error is cryptomnesia, the inappropriate attribution of others' ideas to one's self. Other source monitoring problems include the false fame effect and the sleeper effect, in which people forget the source of information and then accept information as more credible than they previously thought.

Another way memory can be disconnected from reality is by creating false memories. Sometimes false memories are for things that are likely to have occurred. False memories may also be implanted from outside sources by suggestion, especially repeated suggestion. Implanted memories are more likely to occur if people engage in visual imagery and are encouraged by other people. Finally, the incidence of source monitoring errors and false memories is heightened by hypnosis in which a person wants to cooperate with the hypnotist, leading to the acceptance of information as being real memories that would have otherwise been rejected as imaginary.

Finally, we looked at instances of where problems in memory can occur through its normal use. In one case, memory for witnessed events became worse after people talked about the events. This is verbal overshadowing. Also, information that is revealed slowly is more likely to be falsely remembered, as with the revelation effect. Overall, while memories often correspond well to reality, there are exceptions.

## STUDY QUESTIONS

1. What is source monitoring? What are the different types of source monitoring?
2. Generally speaking, what happens when a source monitoring error occurs? More specifically, what are some of the ways that source monitoring errors produce problems?
3. What is source cuing and how can this help memory retrieval?
4. What are cryptomnesia, the false fame effect, and the sleeper effect? How are each of these related to the process of source monitoring?
5. How can false memories be created by hearing related sets of information?
6. How are false memories implanted? What influences the probability that a false memory will be created?
7. What is the best way to describe the effect of hypnosis on attempts to remember?
8. What is the influence of providing a verbal description of a witnessed event on memory?
9. Does slowly revealing information to people make memory more or less accurate? Why?

## KEY TERMS

cryptomnesia, DRM paradigm, external source monitoring, false fame effect, false memories, hypnosis, imagination inflation, internal source monitoring, reality monitoring, revelation effect, sleeper effect, source cuing, source monitoring, verbal overshadowing, wishful thinking bias

## TRY IT OUT

There are a number of ways that memory can be inconsistent with reality. This Try It Out section outlines two ways to find such differences, namely the processes of source monitoring and the creation of false memories.

- As a reminder, **source monitoring** is the ability to tell where a memory came from. There are also three types of source monitoring: internal, external, and reality monitoring. You can do whichever version you find the most interesting. First, create a list of 40 five- to seven-letter two-syllable nouns. Then randomly assign these words to two conditions. Have people go through the list, presenting the words in one of these three ways:
  - For **internal source monitoring**, have people read 20 words out loud, and have them read 20 other words silently (mix up the aloud and silent reading). For the memory test, have people indicate whether the words were actually said or just imagined. If all goes well, most of the source monitoring errors should occur where people say that words they only imagined were actually said.
  - For **external source monitoring,** you need two experimenters (if they are of the same gender, that is even better). Have the experimenters take alternating turns reading the words aloud, with one person reading 20 words and the other reading the rest. For the memory test, have people indicate which words were said by which experimenter.
  - For **reality monitoring**, read 20 of the words aloud to people, and have them imagine the other 20 words being said in your voice. For the memory test, have people indicate whether the words were actually said or just imagined. If all goes well, most of the source monitoring errors will be where people say that words they imagined were actually said by you.

At the end of the list, give people a distractor task, such as solving math problems, to occupy their time for 5 or 10 minutes. At the end of the distractor period, give people the entire list of 40 words and have them indicate from which source the word came from.

- To assess **false memories**, you can use the DRM paradigm described earlier. Read people lists of 15 words that are strongly related to a target word, which will become a false memory. You can use the list in Table 12.2, or one of these three lists:

  **Bread:** butter, food, eat, sandwich, rye, jam, milk, flour, jelly, dough, crust, slice, wine, loaf, toast

  **Needle:** thread, pin, eye, sewing, sharp, point, prick, thimble, haystack, thorn, hurt, injection, syringe, cloth, knitting

  **Soft:** hard, light, pillow, plush, loud, cotton, fur, touch, fluffy, feather, furry, downy, kitten, skin, tender

- Read the words to people one at a time at a rate of about 1 second per word. When you are done, have people recall as many words as they can remember on a sheet of paper. This can be done individually or in groups, but you should have at least 24 people. After they are done with recalling, collect their response sheets and tabulate how many false memories occurred.